416/128

2)

A.D. 1914. JUNE 19. N°. 14,743.

JACOB LOHNER & CO.'S COMPLETE SPECIFICATION.

14743

(1 SHEET

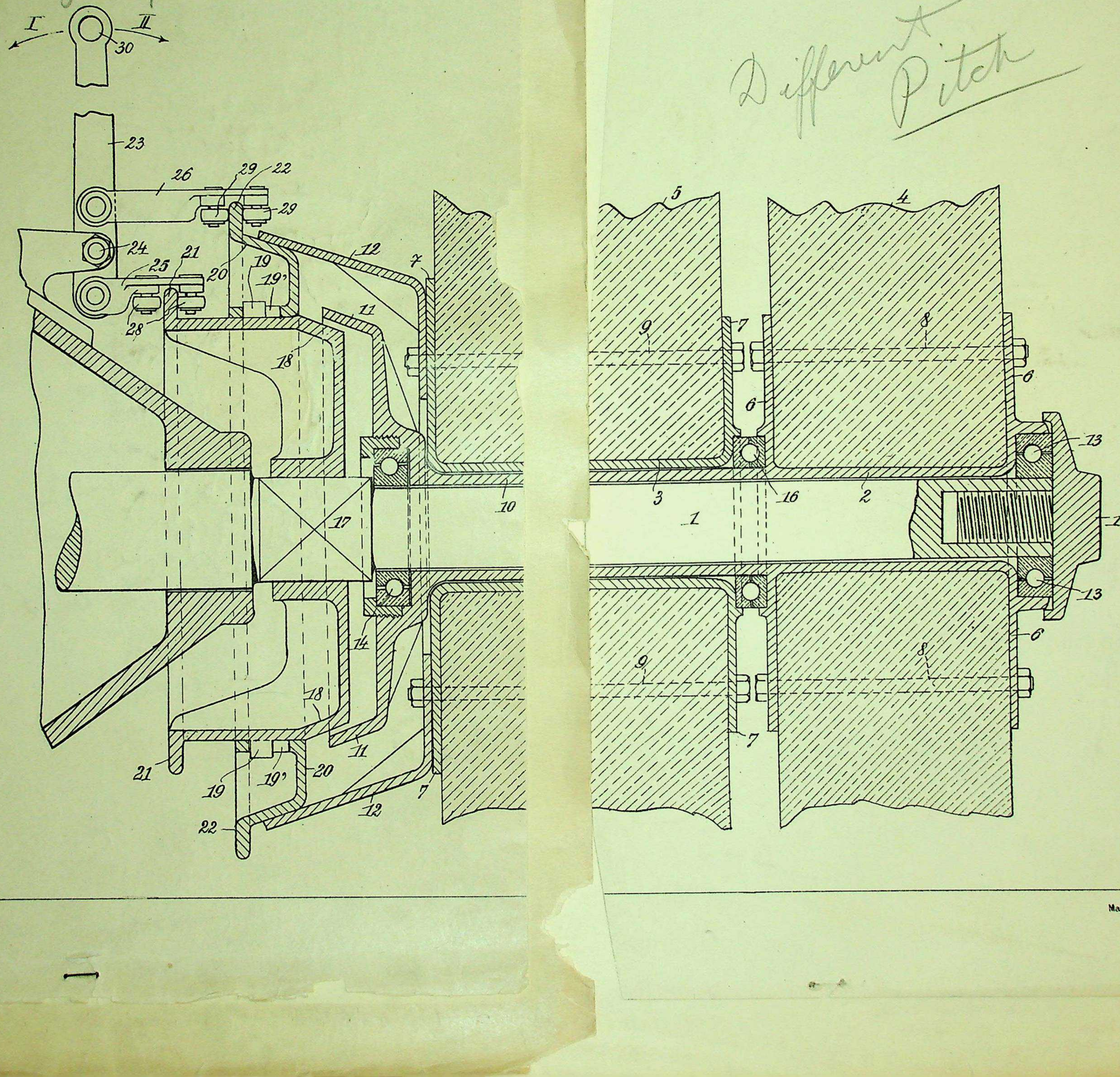
T

~~244-29~~

June 10/15

~~170~~-135.28

Different Pitch



Malby & Sons, Photo-Litho

~~244,025~~ 22

Dec 9

N° 14,743 A.D. 1914

(*Under International Convention.*) DUPLICATE

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in Austria), } *27th Apr., 1914*

Date of Application (in the United Kingdom), 19th June, 1914

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 10th June, 1915

COMPLETE SPECIFICATION.

An Improved Propeller Drive for Aeroplanes and the like.

We, the Firm Jacob Lohner & Co., of No. 2, Porzellangasse, Vienna, Austria, Manufacturers, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to and has for its object to provide an improved propeller drive for aeroplanes and the like.

Aeroplanes which are driven by two or more motors can no longer be driven by the same propeller in the same advantageous manner when one or more of these motors break down, because the power of the remaining motor drive is not sufficient to impart the necessary speed of rotation to the propeller. Further when altering the speed, or when ascending with the aeroplane, the speed of the motor had to be altered or increased. The attempt has been made to use in cases of this kind air propellers having a pitch which could be regulated during rotation, so that on one of the motors breaking down a lesser pitch could be given to the propeller corresponding to the reduced work of the motor, while for the purpose of obtaining rapid flight or for ascending the pitch of the propeller was increased. These forms of propellers, however, did not answer practical requirements for the following reason among others, *viz.* that it is not very well possible to build such a regulating or adjusting mechanism into the aeroplane screw propeller, which requires to be made with great precision, and to resist great strains. When the one existing propeller is damaged the pilot is compelled to land by volplaning.

According to this invention all these drawbacks are simply and effectively obviated by means of two or more propellers of different pitch mounted loosely on a common shaft and adapted alternatively to be coupled thereto. When in use one or the other propeller, as required, *i.e.* in accordance with the required power, is coupled up with the driving shaft while the other propeller or propellers run idle. For the last case mentioned in the above paragraph the existing propellers may be of the same pitch.

[*Price 6d.*]

In connection with variable speed gearing it has been proposed to employ a plurality of concentric sleeves mounted on a shaft, and provided on one end with actuating collars and on the other end with conical clutching members which were adapted to engage other conical clutching members secured on the ends of another set of concentrically mounted sleeves having gear wheels of varying diameters. Actuating means were provided, consisting of pivoted forked levers, which were oscillated by eccentrics secured on a common shaft at such angles with respect to each other that only one pair of clutching cones could engage at the same time.

One form of a clutch for the improved propeller drive is shown by way of example in the accompanying drawing in longitudinal section.

On the propeller shaft 1, which may form either the extension of the motor shaft or a separate shaft driven by gearing from the motor, the hubs 2 and 3 of two propellers 4 and 5 arranged behind each other and having, if required, different pitches, are fitted loosely one on the top of the other, in such a way as to be incapable of longitudinal movement. The attachment of the propellers 4 and 5 to the hubs 2 and 3 is effected in a known manner by flanges 6 and 7 provided on the latter, and screw bolts 8 and 9 connecting the said flanges and extending through the propellers. The hub 2 is extended to form a sleeve 10 surrounding the shaft 1, which sleeve 10 ends in a cone 11 with internal friction surface. To the flange 7 of the hub 3 surrounding the sleeve 10 a larger friction cone 12 enclosing the cone 11 is fixed. The sleeve 10 runs at both ends on ball bearings 13 and 14 on the shaft 1 and is prevented from moving in an outward direction by a head screw 15 arranged on the end of the shaft, while between the two hubs 2 and 3 another ball bearing 16 is provided, which prevents the flanges of two hubs 2 and 3 from coming into frictional contact.

The shaft 1 at the ball bearing 14 is made square at 17, which part prevents an inward displacement of the hubs 2 and 3. On the square part 17 a cone 18 with external friction surface, corresponding to friction cone 11 is mounted so that it may slide. On the periphery of this cone 18 a number of guide bosses or nibs 19 are arranged which engage with the corresponding longitudinal slots 19^1 of a second friction cone 20 with external friction surface corresponding to the cone 12, and which provide axial guidance for this cone 20 on the cone 18 while causing it to share in the rotary movement.

These cones 18 and 20 are provided with annular flanges 21 and 22 with which a two arm lever 23 engages by means of links 25 and 26 provided on both sides of the pivot pin 24, so that simultaneously with the coupling up of one cone the other cone is disengaged. In order to reduce as far as possible the friction set up between the annular flanges 21 and 22 of the cones 18 and 20 rotating with the driving shaft 1, and the links 25 and 26 respectively, two rollers 28 and 29 are fitted to the end of each link between which rollers the annular flanges 21 and 22 respectively of the cones revolve. The longer arm of the lever 23 is provided at its end with an eye 30, to which is attached a rod or the like leading to the pilot's seat.

The mode of operation of the clutch is as follows:—

When the lever 23 is pulled over in the direction of the arrow I, the cone 18 engaged by the square part 17 with the shaft 1 is pressed by the link 25 against the cone 11 connected by the sleeve 10 to the propeller 4, and thus these two cones 11 and 18 are coupled up, which causes the propeller 4 to rotate. At the same time by means of the link 26 the cone 20 is, owing to its longitudinal slots 19^1, moved out of contact with the cone 12 connected with the propeller 4, that is to say, the cones 20 and 12 are disengaged so that the propeller 5, which may have a different pitch, runs idle on the shaft 1 or on the sleeve 10. When the lever is moved in the direction of the arrow II the cones 20 and 12 are engaged and at the same time the cones 18 and 11 are uncoupled, so that propeller 5 comes into operation while the other propeller is running idle.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A propeller drive for aeroplanes and the like, comprising two or more propellers loosely mounted on a common shaft and adapted alternatively to be coupled thereto, the said propellers having, if desired, a different pitch, for the purposes hereinbefore set forth.

2. A propeller drive as claimed in Claim 1, in which the clutches for the propellers have one handle in common for operating them, so that when the clutch of one propeller is disengaged that of the second propeller is thrown into engagement.

3. A clutch for a propeller drive as claimed in Claim 2, comprising two friction cones, one surrounding the other of which cones one is longitudinally slidable on the propeller shaft, whereas the other cone is longitudinally slidable on the first mentioned friction cone and is also caused to join in the peripheral movement, which cones can be brought alternately into and out of engagement with a corresponding pair of friction cones also surrounding each other and formed on the telescoped propeller hubs.

4. A clutch as claimed in Claims 2 and 3, for two propellers in which a lever having two arms and serving as a handle, acts by means of connecting rods or links arranged on both sides of its pivot pin on each of the friction cones (such as 18 and 20), so that simultaneously with the coupling up of the one cone a disengagement of the other cone takes place.

5. The improved propeller drive constructed and operating substantially as hereinbefore described and illustrated in the accompanying drawings.

6. The improved clutch for the propeller drive claimed hereinbefore, constructed and operating substantially as described and as illustrated in the accompanying drawings.

Dated this 13th day of June, 1914.

MARKS & CLERK.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1915.